

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 09/964,410

REMARKS

Reconsideration and allowance of the subject application are respectfully requested. By this Amendment, Applicant has canceled claim and added new claim 16. Thus, claims 1 and 3-16 are now pending in the application. In response to the Office Action (Paper No. 6), Applicant respectfully submits the pending claims define patentable subject matter.

I. Preliminary Matters

Claim 4 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because the Examiner maintains that “the converter” in line 2 lacks a proper antecedent basis. However, dependent claim 4 does not recite “the converter”. Nonetheless, Applicant has amended claim 4 to change “the conductor plate” to “the conductor”. Accordingly, the Examiner is requested to remove the § 112, second paragraph, rejection.

II. Prior Art Rejections

A. Disclosure of Chardin

Chardin discloses a ferrite rod antenna having a longitudinally split sleeve. As shown in Figures 1-3, the antenna comprises a ferrite rod 1 by a conductive cylindrical split sleeve 2 having a longitudinal split defining a gap 3 and a slot 6 diametrically opposite the gap 3. The effect of the slot 6 is to increase the inductance of the sleeve 2. Opposing edges of the sleeve 3 at the gap 3 are capacitively connected by a plurality of capacitors C1-C4 distributed over the length of the sleeve 2. The sleeve 2 is partially surrounded by a split conductive sleeve 5 which axially slides relative to the

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sleeve 2 so as to vary the inductance of the sleeve 2 (and hence its resonant frequency) based on how much of the slot 6 is covered by the sleeve 5. Coupling to the antenna is obtained by leads 8 and 9 which are connected to each terminal of the capacitor C3.

B. Disclosure of Hadden

Hadden discloses a method and apparatus for facilitating interconnection of antenna lead wires to an integrated circuit and encapsulating the assembly to form an improved miniature transponder device. An additional protective layer of insulation is provided to the top of an integrated circuit chip or die and enlarged plated electrodes are provided to the surface of the additional insulation to form enhanced bonding pads, such pads being electrically connected through the protective layers to the normal bonding pads of the integrated circuit device. The enhanced bonding pads are made of a soft conductive metal such that external wires to be attached thereto can be bonded to the pads using a thermal compression bonding technique.

C. Analysis

Claims 1-7 and 9-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chardin (U.S. Patent No. 3,594,805). Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Chardin in view of Hadden et al. (U.S. Patent No. 5,223,851; hereafter “Hadden”). Applicant respectfully submits that the claimed invention would not have been rendered obvious in view of the cited references.

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The Examiner maintains that Chardin (Figures 1 and 2) discloses all of the features of claim invention including “an antenna comprising a converger, including a conductor 2 which converges a magnetic flux of an EM wave, and a converter 3 comprising a cutout, and a resistance reducer 5 provided on a peripheral portion of the conductor 2, all arranged as claimed.” The Examiner cites Hadden for disclosing that an antenna may be formed on a semiconductor circuit.

By this Amendment, Applicant has amended independent claim 1 to incorporate the subject matter of dependent claim 2. In particular, amended claim 1 recites “a converger, including a conductor which converges a magnetic flux of an electromagnetic wave, the converger having a through hole, into which the magnetic flux is converged, at a center portion of the conductor, and a cutout extending from a part of the through hole to an outer periphery of the conductor.”

Although the Examiner asserts that the claimed converger reads on the conductive cylindrical sleeve 2 and the claimed converter reads on the gap 3 formed by the longitudinal split of the conductive cylindrical sleeve 2 (Figure 1 of Chardin), the conductive cylindrical sleeve 2 does not have any function to converge a magnetic flux but rather converts magnetic flux into voltage. In Figures 1-3 of Chardin, the ferrite rod 1 corresponds to the claimed converger and the conductive cylindrical sleeve 2 corresponds to the claimed converter. However, Applicant submits that it is quite clear that the ferrite rod 1 does not have a through hole and/or a cutout, as required by claim 1.

Accordingly, Applicant respectfully submits that independent claim 1, as well as dependent claims 3-8, should be allowable because the cited references do not teach or suggest all of the features of the claims.

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Independent claim 9 recites, in part, “a first converger, which converges the electromagnetic wave; [and] a second converger facing the first converger.” Claim 9 further recites that the second converger includes “a conductor plate having a through hole, into which a magnetic flux of the converged electromagnetic wave is converged, formed at a center portion thereof so as to have a size which is sufficiently smaller than a wavelength of the electromagnetic wave, and a cutout extending from a part of the through hole to an outer periphery of the conductor plate.” Similar to independent claim 1, Applicant respectfully submits that Chardin does not teach or suggest the claimed second converger having a through hole and a cutout. Further, Applicant respectfully submits that Chardin does not teach or suggest the claimed first converger (i.e., two convergers).

Accordingly, Applicant respectfully submits that independent claim 9, as well as dependent claims 10-13, should be allowable because the cited references do not teach or suggest all of the features of the claims.

Amended independent claim 14 recites “a plurality of antenna elements, serially interconnected with each other, each antenna element including: a converger, including a conductor which converges a magnetic flux of an electromagnetic wave; and a converter, which converts the converged magnetic flux into voltage, the converter being operable independently from a ground potential.” Applicant respectfully submits that Chardin does not teach or suggest a plurality of antennas are serially interconnected and each converter is operable independently from a ground potential. Accordingly, Applicant respectfully submits that independent claim

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14, as well as dependent claim 15, should be allowable because the cited references do not teach or suggest all of the features of the claims.

By this Amendment, Applicant has added new dependent claim 16 to further define the claimed invention by reciting that “a phase delay between voltages outputted from the respective converters is eliminated on the way from the converters to a point at which the output voltages are added.” Applicant respectfully submits that the cited references do not teach or suggest this feature of the claimed invention.

III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Christopher R. Lipp
Registration No. 41,157

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE



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PATENT TRADEMARK OFFICE

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claim 2 has been canceled.

The claims are amended as follows:

1. (Amended) An antenna, comprising:

a converger, including a conductor which converges a magnetic flux of an electromagnetic wave, the converger having a through hole, into which the magnetic flux is converged, at a center portion of the conductor, and a cutout extending from a part of the through hole to an outer periphery of the conductor; and

a converter, which converts the converged magnetic flux into voltage.

3. (Amended) The antenna as set forth in claim [2] 1, wherein the converger includes a resistance reducer provided on at least a peripheral portion of the conductor to reduce resistance against current flowing in the conductor.

4. (Amended) The antenna as set forth in claim [2] 1, wherein the conductor [plate is composed of] comprises a plurality of sub-plates.

5. (Amended) The antenna as set forth in claim 1, wherein the converter [is provided as] comprises a coil.

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7. (Amended) The antenna as set forth in claim 5, wherein a winding number of the coil is at least two [or more].

9. (Amended) An antenna for communicating an electromagnetic wave, comprising:
a first converger, which converges the electromagnetic wave;
a second converger[, which faces] facing the first converger and [includes] including
a conductor plate having a through hole, into which a magnetic flux of the
converged electromagnetic wave is converged, formed at a center portion thereof so as to have a
size which is sufficiently smaller than a wavelength of the electromagnetic wave, and
a cutout extending from a part of the through hole to an outer periphery of the
conductor plate; and
a converter, which faces the through hole of the conductor plate to convert the converged
magnetic flux into voltage.

13. (Amended) The antenna as set forth in claim 9, wherein the converter [is provided
as] comprises a coil.

14. (Amended) An antenna, comprising:
a plurality of antenna elements, serially interconnected with each other, each antenna
element including:

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a converger, including a conductor which converges a magnetic flux of an electromagnetic wave; and

a converter, which converts the converged magnetic flux into voltage, the converter being operable independently from a ground potential.

New Claim 16 has been added.